

Hydroponics System Project

Creative Theme

Inquiry: *How can we use creativity to solve the modern global demand to provide safe, sustainable food to a constantly growing population?*

Goal: *To create the most effective hydroponic system possible based on your research and use of knowledge of plant biology and photosynthesis.*

Steps:

Step 1 – Into to Hydroponics

Research various types of hydroponic systems and their uses.

- What is the historical significance of hydroponic systems?
- What are the most basic components necessary for a simple hydroponic system?
- How many types of hydroponic systems are there? What are they? What are the pros and cons of each?
- What kinds of possibilities does hydroponics provide for current and future generations?

Step 2 – Plant Biology

- What are the basic components of a plant cell? What are their functions?
- How does a plant cell differ from a human cell?
- What are the essential nutrients needed in order to maintain functioning in a plant cell?
- What vital roles do the cell membrane and the chloroplast play in a plant cell?

Step 3 – Explore the process of photosynthesis

- Be able to thoroughly explain the process of photosynthesis.
- How and where is chlorophyll created and how does it facilitate photosynthesis?

- What are the essential components needed for the process of photosynthesis and what are its byproducts?

Step 4 - Choose and plan your design for your hydroponic system.

- What hydroponic design do you think will work best based on your research?
- What materials are needed to create your design? What materials are available?
- How many plants will you try to grow? What types of plants will work best for your system?
- How will you divide the work evenly among all group members?
- Carefully draw a detailed blueprint of your design including a list of all necessary materials and steps.

Step 5 - Create and test your hydroponic system.

- Collect all materials and build your hydroponic system.
- Maintain your system by making adjustments when necessary.
- Carefully record growing conditions and track your plants' progress.
- Use your plants to reexamine plant cell biology in a microscope lab.